melting of the snow must occur at very different times of the year. The Memel also possesses reservoirs in its marshes, and its region is perhaps better wooded than that of the other streams of Germany, but the long and hard winters cause an accumulation of large masses of ice and snow which melt suddenly and almost simultaneously in the whole region.

Herr Graeve takes up various other points, which have a practical bearing on navigation, but for these we must refer the reader to his memoir. He remarks in concluding on the desirability of comparing the conditions of outflow of German rivers with corresponding data for other European rivers, though at present the scanty and incomplete character of the data at hand render such inquiry scarcely practicable.

SCIENTIFIC SERIALS

THE *Journal of the Russian Physical and Chemical Society*, vol. xii. fascicules 5 and 6, contain, besides the minutes of meetings of the Society, the following papers:—In fascicule 5: On the dosage of chromium, by M. Th. Willm.—On the composition of the hydrate of peroxide of barium, by M. E. Schöne.—On the distribution of naphtha on the peninsula of Apsheron, by M. S. Goulichambaroff.—On the oxidation of ketones, by M. Goldstein.—On the products of oxidation of erythrite, by M. S. Przibytek.—A necrology of Prof. Nicolas Zinin, by MM. Borodin and Boutleroff.—On the magnetisation of liquids, by M. Ziloff.—On hail, by M. Schwedoff.—Notes by M. Latchinoff on specific heat, on a new dynamometer, and on electrical light.—In fascicule 6: On chlorocamphoric oxide, by M. Latchinoff.—On the action of heat on phosphorites, by M. Beletzky.—On tetrolic acid, by M. Lagermark.—On the solidification and evaporation of drops of liquid, by M. Sloughinoff.—On the dosage of mercury and arsenic in corpses; and an analysis of the artesian wells of Staraya Rousia.

Revue internationale des Sciences biologiques, July, 1880.—J. L. de Lanessan, on the protozoa (a chapter with illustrations from the author's forthcoming "Manuel d'Histoire Naturelle médicale).—A. Hovelacque, on the inferior races of mankind.—M. Debierre, man before and on the threshold of history.—Proceedings of the Academies of Paris, Belgium, and Amsterdam.

August.—J. L. de Lanessan, the coloration and the colouring-matters in plants.—M. Moniez, on the cysticers of Tænia.—M. Debierre, man before and on the threshold of history.—Proceedings of the Academies of Paris, Belgium, and Amsterdam.

September.—M. Vulpian, physiological study of poisons: curare.—M. J. L. de Lanessan, the saccharomycetes and the fermentations caused by them.—Prof. W. H. Flower, on the comparative anatomy of man (translated from NATURE).—M. R. Moniez, on cestoid worms and helminthologists.—Proceedings of the Academy of Paris.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, November 18.—Prof. H. E. Roscoe, president, in the chair.—It was announced that a ballot for the election of Fellows would take place at the next meeting (December 2).—The following papers were read:—Notes on the oxides of manganese, by Spencer Pickering. Various samples of oxides were procured and heated to various temperatures, until their weight was constant; in some cases they lost weight, in others they gained, whilst in some the weight remained constant.—On aluminium alcohols, by J. H. Gladstone and A. Tribe. When aluminium foil and iodine are heated with alcohol the latter is decomposed, two new organic aluminic compounds being formed, aluminic iodoethylate $(C_2H_5O)_3I_3Al_2$, and aluminic ethylate $Al_2(C_2H_5O)_6$. The authors have applied this reaction to other alcohols, and have thus prepared aluminic methylate, ethylate, propylate (isopropylate could not be obtained), isobutylate, amylate, cetylate, phenylate, cresylate, and thymolate.—Mr. W. H. Perkin then gave an account of the artificial production of indigo by A. Baeyer, and prepared some before the Society. The steps in the process are: toluene C_7H_6O, dichloride of benzyl $C_6H_5CHCl_2$, cinnamic acid $C_9H_8O_2$, orthonitrocinnamic acid $C_9H_7(NO_2)O_2$, orthonitrodibromhydrocinnamic acid $C_9H_7Br_2O_2(NO_2)$; by the action of caustic potash orthonitrophenylpropiolic acid $C_9H_5(No_2)O_2$ is formed, which on reduction in alkaline solution with grape sugar furnishes indigo $C_{16}H_{10}N_2O_2$.—On the synthetical production of new acids of the pyruvic series, by E. Moritz.—On the old alum well at Harrogate, by R. H. Davis. The author gives an analysis of the mineral constituents in the residue.—On the absorption spectrum of ozone, by W. N. Hartley.—On the probable absorption of the solar rays by atmospheric ozone, by W. N. Hartley. The author has photographed and measured the absorption spectrum of ozone; he suggests that the shortening of the solar spectrum at the violet end is due to the presence of ozone in the atmosphere, also that the blue colour of the sky may be ascribed to the same cause.—On peppermint camphor, by M. Moriya of Tokiô. The author has studied carefully the physical characters of this substance; he has also investigated the action of chromic acid, nitric acid, and bromine thereon.

Zoological Society, November 16.—Prof. Huxley, F.R.S., vice-president, in the chair.—Mr. W. K. Parker, F.R.S., read a paper on the development of the skull in the Urodele Batrachians. Mr. Parker described the skull of the adult Gigantic Salamander (*Sieboldia maxima*), the Siren and the Menopoma, and compared their structure with that of the various stages of the skull of the common newt.—Mr. G. E. Dobson, C.M.Z.S., exhibited and made remarks on the head of a partridge (*Perdix cinerea*) with an extraordinary prolongation of the intermaxillary bones.—Mr. W. A. Forbes, F.Z.S., made some remarks on the shedding of the horns of the Prong-buck (*Antilocapra americana*), as recently observed in the specimen living in the Society's Gardens.—Mr. Harting, F.Z.S., exhibited a specimen of Bartram's Sandpiper, recently killed in Lincolnshire.—Mr. Sclater exhibited the skin of the Guinea Fowl, lately described in the Society's *Proceedings* as *Numida Ellioti*. Further investigation had induced him to believe that this bird was the same as *Numida pucherani* of Hartlaub, the inaccurate colouring of the head in Mr. Elliot's figure of that species having prevented its identification.—Mr. G. A. Boulenger read a paper on the Palæarctic and Æthiopian species of *Bufo*, of which he recognised ten species: four in the Palæarctic, five in the Æthiopian region, and one found in both regions.—A communication was read from Dr. Otto Finsch, C.M.Z.S., in which he gave a list of the birds of the Island of Ruk, in the Central Carolines.—A second communication from Dr. Finsch contained the descriptions of some new or little-known species of pigeons from the Caroline Islands.—A communication was read from Mr. Edgar A. Smith, containing an account of the shells of the genus *Myodora* of Gray.—A communication was read from Mr. Martin Jacoby, in which he gave the descriptions of a collection of Phytophagous Coleoptera made by Mr. Buckley at Eastern Ecuador. The collection contained a good many new and interesting species, of which a great part were not alone inhabitants of Ecuador, but had been found either in Peru or the Amazonian region.—A paper by Messrs. F. D. Godman and O. Salvin was read, in which they gave the descriptions of some supposed new species of butterflies collected by Mr. Andrew Goldie in the interior of the district of Port Moresby, New Guinea.

Physical Society, November 13.—Prof. W. G. Adams in the chair.—Mr. Bosanquet, of St. John's College Physical Laboratory, Cambridge, read a paper on the nature of the sounds which occur in the beats of consonance. From mistimed octaves and twelfths he found that when the beats of the harmonics are cleared away each beat consists entirely of variations in the intensity of the lower notes. He gave the mathematical theory of these beats, and likewise of the curves given by the harmonograph. He also described an ear-tube for using in connection with a resonator. It is difficult to get definite results with a resonator unless the passage from the latter to the ear is closed to sound. The ear tube consists of a copper pipe bent into a sickle shape to gird the face, so that the ends may enter the ears, into which they are screwed, plugging them close. The sound is led from the resonator to the middle of the bent pipe by a flexible india-rubber tube, and thence to the ears.—Mr. Brown read a paper on action at a distance. He drew attention to the fact that though Newton disbelieved in action at a distance, he did not pronounce whether the medium was material or immaterial. Mr. Brown showed that the hypothesis of a material medium was encumbered with difficulties, since, among other reasons, direct contact could not explain gravity, projection of small particles from one body to another could not explain attraction, and Lesage's theory of corpuscles (as modified by Mr. Tolver Preston) required an enormous degree of porosity in masses of matter. The nature of magnetism and vibrations was also discussed by the author.—Mr. J. Macfarlane Gray read a paper on the mechanical nature of the forces called attraction, and gave grounds for attributing them to the pressures of a universal material ether of a gaseous nature. The paper was long, and had to be in part left unread. The hypothesis held by Mr. Gray

is remarkably confirmed by numerical results obtained by him.—Prof. Cottrell threw some doubts on Mr. Gray's results on the score that numerical coincidences were not always safe ground for basing theoretical deductions on. Mr. Gray stated that in the parts of the paper which had to be skipped Prof. Cottrell's objections were answered. He also pointed out that Mr. Brown in his criticism of the gasiform ether had not taken into account the important condition that the particles of ether have volume.—Professors Perry and Ayrton read a note on the contact-theory of Herr Exner recently brought before the Academy of Sciences of Vienna. They showed that Exner's experimental results disagreed with the concordant results of several independent experimenters, namely, Kohlrausch, Hankner, and Ayrton and Perry. They concluded that Herr Exner's experiments were inaccurate. They further argued that Exner's second and later paper, so far from being a disproof of the contact theory of electromotive force as now received, is in reality a proof of it. Dr. Wright stated that he will read a paper on this subject soon; and Prof. Reinhold said that Herr Exner had since corrected some of the results of his early papers on contact electricity.—Prof. Minchin of Cooper's Hill Engineering College exhibited a new photo-electric cell. This consists of a vessel of water containing a little acid, carbonate of calcium, and two tinfoil plates. When a beam of lime light was allowed to fall on one of the plates, a powerful current was set up in the cell, as seen by the deflection of a galvanometer connected in circuit with the plates. When a red glass screen intercepted the beam, the effect was very slight. Prof. Minchin had begun his experiments with fluorescence, but found "hard" water containing this salt of lime do equally well. The cell possesses this advantage: that the current it gives soon decreases in the light. When first the light falls on it, the exposed plate is positive, but it soon changes to negative. Prof. Minchin had tried the cell in place of a selenium one in the photophone, but with unsatisfactory results.

Anthropological Institute, November 9.—Edward B. Tylor, D.C.L., F.R.S., president, in the chair.—A paper was read on anthropological colour phenomena in Belgium and elsewhere, by J. Beddoe, M.D., F.R.S. Within the last few years the numerical method had been extensively applied to the determination of ethnological colour-types, the Anthropometric Committee of the British Association having set the example. The Continental nations were, however, now far ahead of us. In Germany Prof. Virchow had procured the tabulation as to the colour of the eyes and hair of all the school population, with the exception of Hamburg. In Switzerland Dr. Guillaume, of Neuchâtel, had obtained school statistics. For Belgium an elaborate monograph had been written on the subject by Prof. Vander Kindere, who, by the aid of the National Geographical Society, had induced the Minister of Public Instruction to include questions on the colour of the children's eyes and hair in the educational census. The results obtained have been of considerable importance, and bring out a remarkable contrast between the Flemish and Walloon provinces of Belgium.—Mr. J. F. Rowbotham read a paper on different stages in the development of the art of music in prehistoric times. Musical instruments, though their varieties may be counted by hundreds, are yet readily reducible under three distinct types: 1. The drum type. 2. The pipe type. 3. The lyre type. And these three types are representative of three distinct stages of development through which prehistoric music has passed. Moreover, the stages occur in the order named. That is to say, the first stage in the development of instrumental music was the drum stage, in which drums, and drums alone, were used by man. The second stage was the pipe stage, in which pipes as well as drums were used. The third stage was the lyre stage, in which stringed instruments were added to the stock. The three stages answer respectively to rhythm, melody, and harmony. And as in the geological history of the globe the chalk is never found below the oolite, nor the oolite below the coal, so in the musical history of mankind is the lyre stage never found to precede the pipe stage, nor the pipe stage to precede the drum stage.—A paper was read on neolithic implements in Russia, by Prince Paul Poutiatine. From the evidence of certain finds on his estate the author came to the conclusion: 1. That the Sclave-Scythians existed there in the stone period. 2. That they possessed instruments resembling those of the Celt-Scythians, and burned their dead. 3. That the old iron period of that neighbourhood was a continuation of the stone period. 4. That they supported themselves partly by hunting. 5. That they understood corn-growing.

Meteorological Society, November 17.—Mr. G. J. Symons, F.R.S., president, in the chair.—The following gentlemen were elected Fellows: G. Corden, E. T. Dowson, F. Hepburn, B.A., C. M. Hepworth, J. Mulvany, M.D., R.N., F. H. G. Newton, Capt. M. Parry, E. P. Phillips, and H. L. Roth.—The papers read were: Table of relative humidity, by Edward E. Dymond, F.M.S.—Rainfall in South Africa, by John G. Gamble, M.A., M. Inst. C.E., F.M.S. The author gives the monthly totals of rainfall from 103 stations for the thirteen months, December 1878 to December 1879, and also the monthly means from all stations in South Africa from which a record of five years or upwards could be obtained. It is shown that the Cape Peninsula, the South-West and the West Coast, have winter rains with a dry summer, characteristics of what is called the subtropical region, the rains coming with the north-west wind or anti-trade; while Natal, Aliwal north, and in a less degree Queenstown, have the tropical features of a wet summer and dry winter. On the South Coast the rainfall appears to be more equally distributed throughout the year, though there seems to be an October maximum at Port Elizabeth and Uitenhage. In the Central and Northern Karroo the maximum of the very scanty rainfall occurs in February and March. These rains generally fall in thunderstorms; each storm seems to come from a westerly direction, but it is a more or less well-ascertained fact that these rains do not fall up country until the south-easters have set in on the South and South-West Coasts. In the south-east of the colony the transition towards tropical features may be noticed, both Grahamstown and King Williamstown showing a winter minimum in June.—On the meteorology of Mackay, Queensland, by Henry L. Roth.—Thermometrical observations on board ship, by Capt. W. F. Caborne, F.M.S.

VIENNA

Imperial Academy of Sciences, November 18.—Contributions to general nerve and muscle physiology, by Dr. Biedermann.—On rhythmic contractions of striped muscles, produced by chemical stimulation, by the same.—On some platino-cyanide compounds, by Herr Scholz.—On resorcin colouring matters, by Drs. Wesselskyund and Benedikt.—On the formation of carboxylnatron acid from Brenz, catechin, and the constitutional formula of benzol, by Prof. v. Barth.—Note on mononitro-pyrogallol, by the same.—The distribution of rainfall over Austria in the period August 11-15, 1880, and its relation to distribution of air-pressure, by Herr Hann.

CONTENTS